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ORIGINAL
COMPLETED

guidelines for preparation of unsolicited proposals

Applied Science
and
Research Applications
(ASRA)

34

National Science Foundation
Washington, D.C. 20550

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GUIDELINES FOR PREPARATION OF UNSOLICITED PROPOSALS DIRECTORATE FOR APPLIED SCIENCE AND RESEARCH APPLICATIONS (ASRA)

FOREWORD

The Directorate for Applied Science and Research Applications (ASRA) was established in February 1978 as a result of an extensive reorganization of the Foundation's applied research programs. The goal of ASRA is to increase the contribution of science and technology to the Nation by identifying and supporting research and related activities having the highest potential for contribution to the understanding and resolution of significant problems. ASRA both replaces and incorporates many of the functions of its predecessor, the Research Applied to National Needs (RANN) program. A description of the major ASRA program elements and objectives is provided in Appendix VII.

This document provides guidance for the preparation and submission of unsolicited proposals to ASRA and for the administration of ASRA-funded projects. Many of the following sections have been taken directly from *Grants for Scientific Research (GSR)*, NSF 78-41, NSF's principal proposal guidelines for its basic research programs. For the convenience of those familiar with *GSR*, we have highlighted (see lines in left margins) those sections of this document which differ from *GSR*.

These *Guidelines* do not apply to ASRA's Division of Integrated Basic Research (IBR) (see *Program's-in-Brief* Appendix). IBR does not accept proposals directly from the research community. To accomplish its objectives, IBR will provide support for proposals which have been: (1) submitted to the basic research components of the Foundation in accordance with *Grants for Scientific Research;* (2) favorably reviewed under the provisions of the National Science Board Policy statement, NSF 74-300, Criteria for the Selection of Research Projects by the National Science Foundation; and (3) recommended to IBR for support by the appropriate basic research program director. (For a description of these disciplinary basic research programs, see *NSF Guide to Programs*, which is available from the NSF Publications Unit, Room 234, NSF, 1800 G Street, N.W. Washington, D.C. 20550).

These *Guidelines* apply only to unsolicited proposals. Proposals may be solicited by ASRA from time to time in specific areas or for specific projects through Program Solicitations and Requests for Proposals (RFP's), which are publicized in the *Commerce Business Daily*. Guidelines for preparation and submission of solicited proposals are contained in the solicitations, as are evaluation and selection procedures and any additional requirements for project administration.

Different projects may have different levels of complexity depending on the research proposed. Consequently, applicants should address the requirements called for in these *Guidelines* in a manner appropriate to size, complexity, and expected results of the research effort they propose. By doing so, unnecessary effort and delay will be avoided.

Applicants should also refer to the *NSF Grant Policy Manual*, which is a compendium of policies and procedures relating to the award and administration of NSF grants. Copies of the complete *Manual* are available only by subscription, $12.00 domestic and $15.00 foreign, offered by the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402. The *Manual* is identified by NSF 77-47, and was not assigned a GPO number. The *Manual* is in looseleaf form for periodic updating through supplements, which will be available only through a GPO subscription. The text of the *Manual*, less certain exhibits, was printed in the FEDERAL REGISTER, Part IV, July 29, 1977.

I. GUIDELINES FOR PREPARATION OF PROPOSALS

TYPES OF RESEARCH SUPPORTED

ASRA supports basic and applied research and related activities which are described in the *Programs-in-Brief* section (See Appendix VII). ASRA does not support clinical research or research requiring security classification. In addition, the Directorate will normally not support proposals for:

- Technical assistance;
- Product development or research chiefly of a proprietary nature;
- Specialized facilities or research equipment (except as part of a research proposal); and,
- Research which is duplicative of the activities of another Federal agency.

WHO MAY SUBMIT

Proposals may be submitted to ASRA by colleges, universities, industry, including small business, and other organizations whether operating for profit or on a not-for-profit basis, as well as by State, regional, local units of government and individuals without organizational affiliation.

Joint proposals from combinations of these organizations are encouraged to bring together broader capabilities and interdisciplinary and management skills to provide a more comprehensive approach to complex problems.

Although proposals are normally initiated by those interested in doing the research and submitted by one of the above employing organizations, an award may be made to an individual in the U.S. provided the individual is not employed by or affiliated with an organization that could act as the grantee institution, and the (1) proposed project is sufficiently meritorious and otherwise complies with the conditions of this brochure; (2) applicant has the capability and necessary facilities to carry out the project; and (3) applicant agrees to fiscal arrangements that, in the opinion of the NSF Grants Officer, insure responsible management of Federal funds.

WHEN TO SUBMIT

Research proposals may be submitted at any time. Applicants should allow 6 to 9 months for review and processing. Proposals to be funded in a particular fiscal year (ending September 30) normally should be received no later than January of that year. Some programs may set target dates for submission of proposals to allow time for their consideration by advisory committees, which meet periodically. These target dates will be published in the *NSF Bulletin*.

Every effort is made to reach a decision and inform the applicant promptly. Until a decision is announced, no information can be provided on the probability of support.

WHERE TO SUBMIT

Proposals should be addressed to the Central Processing Section, National Science Foundation, Washington, D.C. 20550. If copies of the proposal are mailed in more than one package, the number of packages should be marked on the outside of each package. Proposals must be sent prepaid, not collect.

NOTIFICATION OF RECEIPT OF FORMAL PROPOSALS

To facilitate prompt acknowledgement of the arrival of the proposal package at the Foundation, the proposer should cut out two Acknowledgment-of-Receipt cards from the back cover of this brochure, fill them in to identify the proposal, address one card to the project director and the other to the official authorized to sign the Cover Page and attach them to the signature copy of the Cover Page. After the proposal arrives at NSF, an assigned proposal number will be stamped on the card before it is addressed to the cognizant program officer and identified by this proposal number. If receipt is not acknowledged within three weeks of submission, the ASRA Programs and Resources Officer, (202) 632-7388 may be contacted for a follow-up.

WHAT TO SUBMIT (Proposal Preparation)

To avoid delay in the review process, the proposal should be complete at the time of submission. ASRA requires twenty copies of all formal proposals, including the original signed copy. Although ASRA does not specify a page limitation on formal proposals, they should be concise and not include material having little relevance to the objectives of the project.

Proposals should be stapled in the upper-left hand corner, but otherwise unbound, single spaced, with pages numbered at the bottom and a one inch margin at the top. The original signed copy should be printed only on one side of each page. The additional nineteen copies may be printed on both sides.

Prior to submission of any preliminary or formal proposal to the Intergovernmental Program, interested persons should contact the Program for guidance on compliance with the submission requirements of the Intergovernmental Cooperation Act of 1974 (42 USC 84251 et. se.) and OMB Circular A-95. This assures compliance with the Project Notification and Review System (PNRS) by notifying the appropriate State and/or areawide clearinghouses as prescribed in Sec. 660.4 of the NSF Regulations, contained in Chapter VI, Title 45, Code of Federal Regulations).

Preliminary Proposals

Potential applicants are encouraged to first consult with the appropriate ASRA program manager to discuss the proposed project and/or submit a brief preliminary proposal from which eligibility and relevance to a particular program may be determined. The preliminary proposal can be used later as a basis for the development of a formal proposal if the applicant decides to proceed further.

The Division of Applied Research (DAR) *does not* accept preliminary proposals; however, the staff will still respond to inquiries regarding potential topics, programs, and proposal format.

Preliminary proposals should be about three to five pages in length and address the following points:

. Identification of the problem and its importance;
2. Specific research objectives;
3. Research plan to meet the objectives;
4. Anticipated results: their utilization and benefits;
5. Qualifications of the principal investigator and other key personnel; and
6. The estimated total project cost and period of performance.

Seven copies of the preliminary proposal should be submitted to the cognizant ASRA Division or Office. If a cover sheet is used, it should be clearly marked "PRELIMINARY PROPOSAL".

No formal institutional approval is required by the Foundation for submission of a preliminary proposal which will be treated as an informal document involving no commitment on the part of either the applying organization or the Foundation. However, such a proposal should not be submitted unless the proposer has reason to believe that, if a formal proposal is subsequently submitted, it will be endorsed by the submitting institution.

Preliminary proposals are reviewed primarily by ASRA staff, although in some instances outside reviewers may be consulted. This review normally requires from four to six weeks. All proposers who submit preliminary proposals will receive a letter either encouraging or discouraging the submission of a complete formal proposal. This preliminary review concentrates on the fit between the proposed research and the emphasis within a targeted program. Encouragement of a formal proposal does not imply the probability a favorable review of that proposal.

Formal Proposals

All formal proposals submitted to ASRA should contain the following elements as appropriate to the nature of the project:

- Cover Page
- Table of Contents
- Project Summary
- Project Description
- Bibliography
- Biographical Sketches of Key Personnel
- Budget
- Current and Pending Support
- Appendixes

COVER PAGE

The standard Cover Page for proposals to ASRA is provided in Appendix I. However, the Cover Page for proposals to the Intergovernmental Program of ISPT is Standard Form 424 (See Appendix II), which may be obtained from areawide or State clearinghouses or Federal Supply Service GSA stores.

If there have been prior discussions with a particular NSF program and the proposal is intended for its consideration, complete the box "For Consideration by ____________ Program".

The title of the proposed research project should be brief, scientifically valid, intelligible to a scientifically literate reader, and suitable for use in the public press. NSF may edit the title of a project before making an award.

The proposed duration for which support is requested should be consistent with the nature and complexity of the proposed research. Research grants may be awarded for a period up to 5 years.

Specification of a desired starting date for the research is important and helpful to NSF staff. However, the institution may not make charges to a grant for costs associated with the project that were incurred before the effective date designated in the grant letter. Should unusual situations, such as long lead time on procurements, create problems regarding the proposed effective date, the investigator should consult the institution's business office for advice and inform the NSF program office to which the proposal has been assigned.

Small businesses should check the small-business box on the Cover Page. A small business must be organized for profit, independently owned and operated (not a subsidiary of or controlled by a large firm), have no more than 500 employees, and not be dominant in its field (See Title 13, Code of Federal Regulations, part 121 as amended). The box should be checked also when the proposal involves a cooperative effort between an academic institution and a small business.

Research proposals should be cleared through the institutional officer having responsibility for Federal business relations to ensure conformance with local and Federal administrative procedures. One copy of the proposal must be signed by the principal investigator and an official authorized to commit the institution in business and financial affairs. Proposing institutions may have additional signature requirements. Other copies should record the names and titles of those who have signed the original. Proposals are incomplete if endorsement signatures are omitted.

TABLE OF CONTENTS

The table of contents, which is required, should show the location of each section of the proposal as well as major subdivisions of the project description, such as the summary of previous work, statement of proposed research, and methods and procedures to be used.

PROJECT SUMMARY

A 200-word summary of the proposed research, suitable for publication and using the format of Appendix III is required. If a grant is awarded, the summary, edited if necessary, will be sent to the Smithsonian Science Information Exchange and made available to the public. The summary should include a statement of the research objectives, scientific methods to be employed, and the significance of the proposed research to the advancement of scientific knowledge. It should be informative to other scientists in the same or related fields and, insofar as possible, understandable by a scientifically literate reader.

PROJECT DESCRIPTION

The specific requirements of this section will vary depending on the ASRA Division or Office to which the proposal is directed.

Division of Applied Research (DAR):

The main body of a proposal to this Division should be a detailed statement of the work to be undertaken and should include: objectives and expected significance; relation to the present state-of-knowledge in the field, to previous work done on this project, and to related work in progress elsewhere. The statement should outline the general plan of work, including the broad design of experiments to be undertaken and an adequate description of experimental methods and procedures. Any substantial collaboration with individuals not referred to in the budget should be described and documented with a letter from each collaborator. In addition, the proposer should carefully assess the potential utility of the proposed research and judge whether or not successful completion of it may reasonably be expected to result in either information of immediate use to specific policymakers or in technology which may be of immediate application.

If the proposer believes that the research will have some short-term payoff upon completion, a section entitled "Utilization Strategy" should be included in the proposal. Where appropriate, this section should include such things as: discussion of how potential users are to be involved in either design, conduct, evaluation or dissemination of the research; strategies for disseminating technology or information to potential user communities, etc. The budget for the proposal should reflect such activities.

If the proposer believes that the proposed research has only a longer-term payoff or that a number of studies and developments, of which this study is only one, will be required before the work may be directly applied to a problem area, then a section entitled "Application Potential and Future Requirements" should be included in the proposal. This section should discuss such things as the applied problem towards which the research is oriented and its long-run social, economic or technological significance, and give a clear idea of the additional research and applications which might be required eventually to realize the full potential of the research.

Failure to include one of these sections in the proposal and, where relevant, to have it reflected in the overall study design and budget will reduce the likelihood of support since reviewers will be asked to assess the potential utility of the proposed work. For those familiar with the requirements of *Grants for Scientific Research*, the requirements of this Division can be met by adding a section on utility and utilization as described above to the *GSR* format.

Division of Problem-Focused Research Applications (PFRA); Division of Intergovernmental Science and Public Technology (ISPT); and Office of Problem Analysis (OPA):

The project description should contain the following elements as appropriate to the nature of the project:

a. Research Objectives—The proposal must describe how the proposed work can lead to the identification and/or solution of important problems or key aspects of such problems. The following points should be included:

1. A clear statement of the problem(s) or issue(s) the proposed effort will address and the anticipated contribution of the effort to the solution;
2. Enumeration of the specific objectives of the research and of the questions the research will try to answer;
3. Statement of the expected consequences of successful completion of the research;
4. Identification of any specific policy decisions or issues which might be affected by the research.

b. Research Plan—The research plan should describe the research design and methods in enough detail to enable program managers and peer reviewers to judge readily the merit and practicability of the project. The design should be closely linked to the questions which the research will try to answer. The methodology to be employed should be clearly stated. The sequence of planned work tasks and subtasks should be carefully explained. A graphic schedule or work plan should be included, showing the duration, sequence and time (in weeks or months from award date) of principal events or milestones. A discussion of related research and other relevant projects, as well as appropriate literature citations, should be included to show that investigators are thoroughly familiar with current and prior research in pertinent fields and the actual state-of-the-art. If a body of law or practice severely limits the options or subject matter under study, those limitations should be indicated.

c. Utilization Plan—Each proposal is expected to include a utilization plan which describes the steps necessary to facilitate the use of research results by the relevant public or private sector communities and by other scientific researchers.

The utilization plan should include the following elements:

1. User Group Identification and Participation—To the extent practicable, the plan should identify the specific groups and individuals that might be expected to use the projected results. Potential users who have been or will be involved in the planning, conduct, or oversight of the proposed research should be identified. Evidence of the extent to which the potential user communities perceive the need for solutions to the problems addressed by the research should be provided.
2. User Demand Description—Where a specific product or process is identifiable as an expected result of the proposed research, the plan should estimate the nature of the existing market and long-range potential demand, and the actions required to achieve

utilization. Anticipated barriers to achieving full use should be identified with recommendations for surmounting them.

3. Utilization Process Description—The plan should describe in logical sequence the specific steps needed to provide for dissemination and/or replication of research results. The plan should indicate when the steps will be taken, describe the required level of effort, and identify the persons responsible for implementing the plan.
4. Utilization Costs—Estimated costs of utilization activities, including technical assistance and information dissemination, should be clearly indicated in this section. Adequate funds to cover costs of implementing utilization plans should also be incorporated in the proposal budget.

d. Organization and Management Plan—Each proposal should contain a clear explanation of the arrangements for direction, coordination, and control of the project. The plan should delineate the roles and responsibilities of team members and, for complex tasks, the lines of communication. An organization chart showing the reporting relationship of key tasks and performers in the project should be included. Complex projects may require a project manager as well as a principal investigator. In such cases, the responsibilities of each should be clearly stated. It is essential that a single focus of management responsibliity be established and maintained.

If specialized personnel, facilities, or arrangements are required, these should be specified. If an advisory group will be established to afford continuing appraisal by users and scientific and technical specialists, its composition and role should be described. If major tasks are to be subcontracted or shared, the associated organizations and the specific tasks should be identified and the arrangements for supervising explained.

e. Reason for ASRA Support—Proposals should indicate the reasons for requesting support from ASRA rather than from the applicant organization, private sector sources, or from other Federal agencies.

f. Pre-existing Patents and Inventions Relating to the Proposed Work—If the proposal involves research during which inventions may be made or new products or processes (or improvements thereon) developed, the proposal must include a statement as to whether or not the proposed research relates to or is dominated by any preexisting patents or patent applications owned or controlled by the applicant institution, the principal investigater, or any subawardee. Any such related background patents or patent applications should be fully identified and copies provided. (Also see Section VI, Inventions, Software and Copyrights).

BIBLIOGRAPHY

A bibliography of pertinent literature is required.

BIOGRAPHICAL SKETCHES OF KEY PERSONNEL

A short biographical sketch of each senior scientist should be included and a list of each investigator's publications during the past 5 years, including those in press.

The proposal should also include information on exceptional qualifications of other individuals that merit consideration in the evaluation of the proposal.

BUDGET

Each proposal must contain a budget for each year of support requested and a cumulative budget for the full term of requested ASRA support. (The prescribed budget format may be reproduced from Appendix IV or Exhibit II-4, *NSF Grant Policy Manual)*. Contributions to the proposed research from other Federal and non-Federal sources (other than from the submitting institution itself) should be shown under "Remarks".

The proposal may request funds under any of the categories listed so long as the item is considered necessary to perform the research. The Foundation requires cost sharing in accordance with policies set forth in the *NSF Grant Policy Manual.*

a. Salaries and Wages—As a general policy NSF recognizes that salaries of faculty members and other personnel associated directly with the research constitute appropriate direct costs in proportion to the effort devoted to the research.

The names of the principal investigator, project manager, faculty, and other senior associates, and the estimated number of academic-year, summer, or calendar-year person-months for which NSF funding is requested should be listed. For postdoctoral associates and other professionals, list each position with the number of full-time-equivalent person-months and rate of pay (hourly, monthly, or annually) indicated. For graduate and undergraduate students, secretarial, clerical, technical, etc., only the total number of persons and total amount of salaries per year in each category are required. Salaries requested must be consistent with the institution's regular practices.

The submitting institution may request that salary data on senior personnel not be released to persons outside the Government. In this case, the item for senior personnel salaries in the formal proposal may appear as a single figure and the person-months represented by that amount omitted. If this option is exercised, however, senior personnel salaries and person-months must be itemized in a separate statement, two copies of which should accompany the proposal (see "Proposal as Public Record"). This statement must include all of the information requested in the Summary Proposal Budget for each person involved. NSF will not forward the detailed information to reviewers and will hold it privileged to the extent permitted by law. The information on senior personnel salaries will be used as the basis for determining the salary amounts shown in the grant budget.

NSF regards research as one of the normal functions of faculty members at institutions of higher education. Compensation for time normally spent on research within the term of appointment is deemed to be included within the faculty member's regular institutional salary. Grant funds may not be used to augment the total salary or rate of salary of faculty members during the period covered by the term of faculty appointment or to reimburse faculty members for consulting or other time in addition to a regular full-time institutional salary covering the same general period of employment.

Summer salary for faculty members on academic-year appointments will not be funded for more than two-ninths of their regular academic-year salary. This total includes summer salary received from all NSF-funded grants. Exceptions to this limitation are permitted only in unusual cases, which must be fully justified in the proposal.

These same principles apply to other types of organizations such as research institutes. Since their employment periods are usually annual, however, there is seldom a possibility of "summer salary" in an NSF grant.

A special question sometimes arises when an independent institute or laboratory proposes to employ college or university faculty members on a part-time basis. In such cases the general intent of the policies above shall apply, so that an individual's total income will not be augmented in ways that would not be possible under a grant to an academic institution.

b. Research Assistantships—The budget may request funds for support of graduate students (research assistants) to help carry out the proposed research. Compensation classified as salary payments should be requested in the salaries and wages category. Any funds requested for tuition remission should be listed separately under "All Other Direct Costs."

c. Fringe Benefits—If the grantee's usual accounting practices provide that its contributions to employee "benefits" (social security, retirement, etc.) be treated as direct costs, NSF grant funds may be requested to defray such expenses as a direct cost.

d. Equipment—NSF defines equipment as an item of property that has an acquisition cost of $300 or more and an expected service life of one or more years. Items of needed equipment should be listed individually by description and estimated cost, including tax, and adequately justified. Allowable items ordinarily will be limited to scientific equipment and apparatus that are not already available for the conduct of the work. General-purpose office equipment normally will not be considered eligible for support.

The purchase of each item of equipment costing $1,000 or more requires prior written approval by NSF. This approval may be indicated on the grant budget or in subsequent correspondence. If a proposal includes the purchase or lease of special-purpose equipment having a unit acquisition cost above $10,000, the authorized organizational representative must certify that the equipment (a) is essential and not reasonably available and accessible to the project and (b) if funded by NSF, will be subject to reasonable inventory controls, maintenance procedures, and organizational policies that will enhance its multiple or shared use on other projects, if the other use will not interfere with the work on the project for which the equipment is being acquired. Because of the lead time involved, it may not be practical for an institution to make this certification when it submits the proposal. In such cases, NSF will accept a statement to that effect in the proposal with the understanding that the certification will be supplied before a grant is made.

e. Materials and Supplies—The budget should indicate in general terms the types of required expendable materials and supplies with their estimated costs. The breakdown should be more detailed when the cost is substantial.

f. Domestic Travel—The type and extent of travel and its relation to the research should be briefly specified. Funds may be requested for field work, attendance at meetings and conferences, other travel associated with the research, and subsistence. In order to qualify for support, however, attendance at meetings and conferences must enhance the investigator's capability to perform the research, plan extensions of it, or disseminate its results. Consultants' travel costs also may be requested.

g. Foreign Travel—Travel in the United States and its possessions, Puerto Rico, and Canada is considered domestic travel; all other is foreign. The proposal should include relevant information (including countries to be visited) and justification of any foreign travel planned in connection with the research. Each foreign trip not specifically included and authorized in the grant budget must receive written approval by the Foundation if grant funds are to be used.

Allowances for air travel normally will not exceed the cost of round-trip, jet-economy air accommodations. Persons traveling under NSF grants or contracts must travel by U.S. flag carriers, if available, unless:

1. The traveler, while enroute, has to wait 6 hours or more for an available U.S. carrier.
2. The flight by a U.S. flag carrier takes 12 or more hours longer than a foriegn carrier.

h. Publication Costs/Page Charges—The budget may request funds for the costs of preparing and publishing the results of research conducted under the grant, including costs of reports, reprints, page charges, or other journal costs (except costs for prior or early publication), and necessary illustrations.

i. Computer (ADPE) Services—The cost of computer services, including computer-based retrieval of scientific and technical information, may be requested. A justification based on the established computer-service rates at the proposing institution should be included. The budget also may request costs, which must be shown to be reasonable, for leasing automatic data-processing equipment (ADPE). The purchase of computers or associated hardware should be requested as items of equipment.

j. Consultant Services—Anticipated consultant services should be justified and information furnished on each individual's expertise, primary organizational affiliation, daily compensation rate, and number of days of expected service. Consultant's travel costs should be listed separately under travel in the budget. Payment for a consultant's services may not exceed the daily equivalent of the maximum rate paid a U.S. Government GS-18 ($183). The compensation limitation to the level of a GS-18 is the limit for personal compensation exclusive of indirect costs, travel, per diem, clerical services, vacation, fringe benefits and supplies.

k. Participant Support Costs—Normally budgets do not include costs for participant support. The use of this category in proposals for support of conferences, symposia, or workshops is discussed in Section IV.

l. Other Direct Costs—The budget should itemize other anticipated direct costs not included under the headings above. Examples are: aircraft rental, space rental at research establishments away from the grantee institution, minor building alterations, payments to human subjects, service charges, and construction of equipment or systems not available off-the-shelf. Reference books and periodicals may be charged to the grant only if they specifically relate to the research project.

Subcontracts should be disclosed in the proposal so that the grant instrument will contain their prior approval. There should be a completed budget, in the prescribed NSF format, for each subcontract with signatures of officials of the subcontracting organization. The amount of each subcontract should appear as a line item under "All Other Direct Costs" of the master budget for the project. None of the research effort under an NSF grant may be contracted or transferred to another organization without prior written approval by NSF.

m. Indirect Costs—The indirect cost rate negotiated by the institution with the cognizant Federal negotiating agency must be used in computing indirect costs for a research proposal. Determination of the appropriate indirect cost rate depends on a combination of factors including, but not limited to physical location of the work. If your institution has no established indirect cost rate, it should either consult the Foundation, which will establish liaison with the cognizant Federal negotiating agency, or submit separately an indirect cost rate proposal to the NSF Division of Grants and Contracts, Attention: Indirect Costs, Washington, D.C. 20550. Rate-proposal data vary according to the type of proposing organization. An institution may obtain appropriate guidelines for submitting rate proposals from the Division of Grants and Contracts (telephone: (202) 632-7545).

It is NSF policy that grantees are entitled to full reimbursement from grant funds for indirect costs allocable to the NSF share of allowable direct costs of a project except for grants:

- to individuals;
- solely for the support of travel, equipment, construction of facilities, or doctoral dissertations;
- for participant support costs (see "Conferences, Symposia, and Research Workshops"); and
- foreign grantees.

CURRENT AND PENDING SUPPORT

Appendix V gives the format for reporting current and pending support for proposals, as well as for each subsequent funding request in the case of continuing grants. Besides the proposed project, all current research to which the principal investigator and other senior personnel have committed a portion of their time must be listed, whether or not their salaries are included in the budgets of the various projects. The number of person-months or percentage of effort to be devoted to the projects should be stated regardless of source of support. In addition, similar information must be provided for all proposals that are being considered by or will be submitted soon to other possible sponsors including NSF.

If the project now submitted has been funded previously by a source other than NSF, the information requested in the paragraph above should be furnished for the immediately antecedent funding period. This information will help the Foundation analyze shifts in research support.

If the proposal is being submitted to other possible sponsors, all of them should be listed. Concurrent submission of a proposal to other organziations will not prejudice its review by the Foundation.

APPENDIXES

a. Facilities—An appendix to the proposal should describe available facilities and major items of equipment to be used in the research.

Proposals requesting multiple-use equipment should describe comparable equipment that is already at the proposing institution and explain why it cannot be used. The degree of utilization also should be discussed.

Equipment to be purchased, modified, or constructed should be sufficiently described to allow comparison of its capabilities with the needs of the research. Whenever possible, the proposal should specify the manufacturer and model number.

b. Special Considerations—Several situations require that special information and supporting documents be included in the proposal, normally in an appendix, before funding can be approved. Among these are the following, some mandated by Federal law:

1. Research that has an actual or potential impact on the environment.
2. Research in foreign countries.
   Some governments require nonresidents to obtain official approval to do research within their borders. Investigators are responsible for obtaining the required authorizations and for advising NSF that they have been obtained or requested. Advance coordination should minimize disruption of the research.
3. Research in the Antarctic.
4. Research at a registered historic or cultural property.
5. Research involving the use of recombinant DNA molecules generated *in vitro*.
6. Research involving the use of human subjects, hazardous materials, laboratory

animals, marine mammals, or endangered species.

In addition, the proposal should alert NSF officials to unusual circumstances that require special treatment, including, for example, proprietary or other privileged information in the proposal, matters affecting individual privacy, or possible national security implications.

The proposal should address each special consideration that is relevant to the project and provide information on the status of any special permissions, clearances, or certifications. Assessment of environmental impact should be included where appropriate.

Specific guidance on the need for additional documentation may be obtained from the institution's research administration office or the *NSF Grant Policy Manual*.

II. PROPOSAL PROCESSING AND EVALUATION

Formal proposals are subjected to a comprehensive peer review process. Each formal proposal is evaluated by scientists, users, or other experts knowledgable in the subject matter from ASRA, or other NSF Divisions, other Federal and governmental agencies, and from the academic, private, and nonprofit communities.

Reviewers comment on and evaluate each of the elements of the proposal; the importance of the project objectives, the project plan, the utilization plan, the organization and management plan, the competence of the project team, and the budget.

Some programs obtain further comment from assembled advisory committees before recommending final action on proposals. Recommendations for awards are further reviewed by senior NSF staff to assure that actions being taken are in accordance with established Foundation policy.

The final decision on each proposal is made by the National Science Foundation, taking into account the need for the research, the interests of other agencies, special circumstances affecting the review, and revisions to the proposal after review, as well as the advice of the reviewers.

When decisions are announced, verbatim copies of reviews, excluding the identity of the reviewer, are available to the investigator/project director. The following criteria or factors are considered in the evaluation of research projects.*

Criteria relating to compentent performance of research—the technical adequacy of the performer and of his or her institutional base:

1. The scientist's training, past performance record, and estimated potential for future accomplishment.
2. The scientist's demonstrated awareness of previous and alternative approaches to the problem.
3. Probable adequacy of available or obtainable instrumentation and technical support.

Criteria relating to the internal structure of science itself:

4. Probability that the research will lead to important discoveries or valid, significant conceptual generalizations within its field of science or (in the most favorable cases) extending to other fields as well.
5. Probability that the research will lead to significant improvements or innovations of investigative method—again with possible extension to other fields of science.

Criteria relating to utility or relevance:

6. Probability that the research can serve as the basis for new invention or improved technology.
7. Probable contribution of the research to technology assessment—* * i.e., to es-

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* Taken from the National Science Board policy statement, NSF 74-300, Criteria for the Selection of Research Projects by the National Science Foundation.

* * The Technology Assessment Working Group is located in the Directorate for Scientific, Technological, and International Affairs (STIA).

timating and predicting the direct and indirect, intended and unintended effects of existing or proposed technologies.

8. Identification of an immediate programmatic context and user of the anticipated research results.

Criteria relating to future and long-term scientific potential of the United States:

9. Probable influence of the research upon the capabilities, interest, and careers of participating graduate students, postdoctoral associates, or other junior researchers.
10. Probability that the research will lead to radiation and diffusion not only of technical results but also of standards of workmanship and a tradition of excellence in the field.
11. Anticipated effect upon institutional structure of U.S. science.

Primary evaluation emphasis for ASRA proposals is on Criteria 1 through 3 which relate to compentent performance of the research but there may also be heavy emphasis placed on Criteria 6 through 8 which relate to the utility and relevance of the research.

III. DECLINATIONS AND WITHDRAWALS

An applicant whose proposal for NSF grant support has been declined may request and receive from the cognizant program officer the reasons for the action. In addition, the principal investigator/project director may obtain verbatim copies of reviews, though not the names of the reviewers. If the program officer's explanation of the declination does not satisfy the principal investigator, he or she may request the Assistant Director/ASRA to reconsider the action to determine whether the proposal received a fair and impartial evaluation. The request for reconsideration must be received within 180 days of the date of the declination letter. (See NSF Important Notice 61, Exhibit II-9, *NSF Grant Policy Manual*).

A declined proposal may be resubmitted for consideration only after it has undergone revision. The Foundation will treat the revised proposal as a new one under the usual review and evaluation procedures.

An applicant may withdraw a proposal at any time before a final decision is made. Normally NSF does not return the proposals to the applicant. The Foundation retains a file copy.

IV. GRANTS FOR OTHER PURPOSES CONNECTED WITH RESEARCH

CONFERENCES, SYMPOSIA, AND RESEARCH WORKSHOPS

ASRA supports conferences, symposia, and research workshops in special areas of science that bring leading scientists together to discuss recent research findings or to expose other researchers to new research techniques. Conferences will be supported only if equivalent results cannot be obtained at regular meetings of professional societies. Although requests for support of conferences, symposia, and research workshops ordinarily originate with educational institutions or scientific societies, they also may come from other groups. Concomitant support by several Federal agencies or private organizations is permissible. Since the proceedings of such meetings interest a wider group than those in attendance and normally should be published in scientific journals, requests for support may include publication costs. Requests for support generally should be made at least a year in advance of the scheduled date.

A proposal for support of a conference, symposium, or research workshop should include:

- A project summary of 200 words or less indicating the objectives of the program.
- A full statement of the need for such a gathering and the list of topics.

- Recent meetings on the same subject, including dates and places.
- Names of the chairman and members of organizing committees.
- A list of proposed participants, information on the location and probable date(s) of the meeting, and the method of announcement or invitation.
- An estimated total budget for the conference together with an itemized statement of the amount of support requested from the Foundation. The budget may include participant support for transportation, per diem costs and stipends (when appropriate), and other conference-related costs. Indirect costs are subject to negotiation with the grantee.
- Support requested or available from other Federal agencies and other contributions.

FOREIGN TRAVEL

ASRA supports a limited amount of international travel to assist scientists going abroad for the following purposes:

1. Attending international scientific congresses and meetings.
2. Obtaining or exchanging information in special areas of scientific research and associated activities.
3. Cooperating in international scientific activities.

Priority is given to activities which strongly relate to ASRA's programs and objectives. NSF treats international travel as all travel outside the United States and its possessions, Puerto Rico, and Canada. U.S. flag carriers must be used when such service is available.

Foreign travel directly related to a research project supported by NSF should be funded out of the project grant. For further information and guidance, contact the appropriate ASRA program manager.

Application forms may be obtained by writing to:

Division of International Programs
National Science Foundation
Washington, D.C. 20550

V. THE AWARD AND CONTINUED GRANT SUPPORT

GRANT AWARD

The Foundation awards two types of grants:

(1) Standard Grants: NSF agrees to support a specified level of effort for a specified period of time with no statement of NSF intent to provide additional future support. Standard grants are fully funded in a single action.

(2) Continuing Grants: NSF agrees to support a specified level of effort for a specified period of the time with a statement of intent to provide additional support for the project, provided funds are available and the results achieved warrant further support. Funding normally will be in one-year increments. The grant letter will state the dollar amount for each committed year. If the annual funding level exceeds $200,000 the grant letter may state an approximate support level with the provision that the actual level will be negotiated annually.

Notification of a grant award is by letter signed by the Foundation's Grants Officer, addressed to the institution to which the grant is made. Copies are included for the principal investigator and the institution's business office.

The grant period begins on the effective date specified in the grant letter or, in its absence, the date of the grant letter and runs until the expiration date indicated. The expiration date usually includes a 6-month "grace period" for which no funds are provided. Expenditures incurred before the effective date of the grant may not be charged against the grant. Expenditures after the scheduled expiration date of the grant may be made only to honor documented commitments made before the expiration date.

REQUESTS FOR RENEWAL OF SUPPORT

Proposals for renewal of a standard grant compete with all other pending proposals and should be submitted 6-9 months before additional funding is required. In preparing a renewal proposal, applicants should assume that reviewers will not have access to the previous proposal or progress reports. In addition to the material discussed in Part I, the renewal proposal should include:

1. A summary of progress to date and its relation to the proposed work.
2. A statement, by categories in the existing grant budget, of expenditures to the date of preparation of the renewal proposal, and of commitments and estimated expenditures to the requested effective date of the renewal grant. If commitments exist or are anticipated that will require the expenditure of any residual funds after the renewal date, they should be explained.
3. A proposed budget for the ensuing period.

For continuing grants, additional funding beyond the approved full term will require competitive review of a new proposal.

Incremental funding for continuing grants within the approved term is based on Foundation staff review of progress reports and proposed budgets and does not require submission of a new proposal. For each increment, two copies of an endorsed request, addressed to the cognizant program office, must be received by the Foundation at least 3 months before the end of the period currently being funded. Requests need only include:

1. A brief summary of scientific progress.
2. A statement of funds estimated to remain unobligated at the end of the period for which NSF currently is providing support; the amount to be carried forward (up to 10 percent of the amount of the current increment); and the residual amount in excess of 10 percent. Only with NSF approval based on adequate justification can amounts in excess of 10 percent of the current increment be carried foward as an addition to the next increment.
3. Three copies of a proposed budget for the ensuing year in the NSF format (Appendix IV). (Indicate on line P any residual amount *in excess* of 10 percent of the current increment).
4. Current information about other research support of senior personnel.
5. Updated Institutional Biohazard Committee and Human Subjects Certification.

NO-COST EXTENSIONS

If additional time beyond the established expiration date of a grant is required to assure adequate completion of the original scope of work within the funds already granted, a no-cost extension may be requested. Normally NSF will authorize no-cost extensions only in the final year, and no single extension may exceed 12 months. For continuing grants, both the interim and final expiration dates may be extended; but the total extension period is limited to 18 months, of which no more than 6 months of the extra time will be permitted before the end of the final support period. Only in exceptional cases will the Foundation approve more than one extension.

Two copies of a request for a no-cost extension, signed by the principal investigator and the authorized organizational representative, must be received by the cognizant program office at least 45 days before the current expiration date of the grant award. The request must fully explain the need for the extension and include an estimate of the unobligated funds remaining and a plan for their use. This plan must coincide with the original or amended objectives of the project. That unobligated funds remain at the expiration of the award is not in itself sufficient justification for an extension.

An approved no-cost extension will be in the form of a formal amendment to the grant specifying a new expiration date.

VI. GRANT ADMINISTRATION HIGHLIGHTS

The administration of research grants is governed by the conditions of the grant instrument. The following information on grant administration deals with questions that investigators often raise. The *NSF Grant Policy Manual* sets forth these and other administrative requirements.

Primary responsibility for general supervision of all grant activities rests with the grantee institution. The principal investigator is responsible for the conduct of the scientific work and the publication of its results and is expected to provide technical leadership to the project whether or not any salary is provided from grant funds.

NSF encourages grantees and principal investigators to seek its advice on administrative problems that may arise. Such advice does not imply an assumption of responsibility by the Foundation for final decisions.

INSTITUTIONS APPLYING FOR THE FIRST TIME

Grants for Federal financial assistance are subject to certain general requirements, such as compliance with the Civil Rights Act of 1964, Title IX of the Education Amendments of 1972, and other laws and regulations prohibiting unlawful discrimination; patent and copyright requirements; cost sharing; the use of U.S. flag carriers for international travel; and the use of foreign currency as appropriate to accomplish the objectives of the project. Organizations that have not previously received an NSF grant should fill out the Applicant Management and Organization Card on the back cover of this brochure and attach it to the original copy of the proposal.

ADHERENCE TO ORIGINAL RESEARCH OBJECTIVES

The principal investigator should feel free to pursue important leads that may arise during the conduct of the research. NSF support will not be jeopardized for the remainder of the grant period if the principal investigator discontinues or materially modifies the originally planned line of inquiry in favor of one that appears to have more scientific promise. NSF must give prior approval, however, when a modification would result in a major deviation from the original research objectives or would include research activities specifically excluded for support when the award was negotiated.

ADHERENCE TO ORIGINAL BUDGET ESTIMATES

The grant instrument includes or refers to a budget that lists the items for which funds are provided. While the principal investigator has reasonable flexibility to alter the direction of research when changes seem scientifically advantageous, the grantee institution must consider the effect of any budget reallocations on the indirect cost portions of the budget and must observe the conditions prescribed by the award. Of particular interest to principal investigators are the following conditions that require specific, written prior approval by the Foundation or the grantee institution's prior approval system for the costs to be reallocated within a previously approved grant budget.

Type of expenditures	**Prior approval required**
1. Alterations and renovations	
a. Under $1,000	OPAS*
b. $1,000 or more	Grants Officer
2. Capital expenditures for land, buildings, or repairs	Grants Officer
3. Contractual (third party) costs	Grants Officer
4. Equipment	
a. Special purpose: $1,000 or more	Program Officer
b. General purpose	Grants Officer
c. Cumulative expenditures that exceed budgeted amount by more than 25%	OPAS*

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* Organizational Prior Approval System (see *NSF Grant Policy Manual*, Sec. 613).

5. News release costs	Program Officer
6. Participant support costs: transfer of funds to other categories of expense	Program Officer
7. Pre-award costs	Grants Officer
8. Production or distribution of books, films, etc.	Grants Officer
9. Rental or lease of facilities	Grants Officer
10. Travel	
a. Each foreign trip and its costs	Program Officer
b. Cumulative domestic travel expenditures which during any budget period exceed: (1) 25% of amount budgeted or $500, whichever is greater; or (2) $500 when no (zero) funds are budgeted	OPAS*
c. Dependent Foreign Travel	Program Officer
11. Hiring Consultants	OPAS*
a. Not provided for in grant proposal or award	

When a budget change requires NSF approval, two copies of a request, signed by the principal investigator and by the grantee institution's authorized official, should be sent to the cognizant NSF office. The request should clearly state which budget items are to be changed and by what amounts and should explain the reasons for the changes.

CHANGES IN PERSONNEL

Written Foundation approval is required for any permanent change in senior personnel or for any temporary change in excess of 3 months, such as an investigator taking sabbatical leave. Further, NSF must be informed when it appears that a principal investigator or other senior personnel will devote substantially less effort to the work than anticipated in the approved proposal. Support from group grants for senior personnel not specifically included in the grant budget or in a subgroup under one of the approved investigators requires prior written approval, which is based on review of a research proposal from the investigator to be included.

TRANSFER OF PRINCIPAL INVESTIGATOR

The Foundation does not transfer grants from one institution to another. If a principal investigator changes organization affiliation, a new proposal may be initiated through the new institution. The original grantee institution may terminate the grant or, when appropriate, propose a substitute principal investigator to continue the research. NSF encourages the principal investigator and the appropriate representatives of the grantee institution or the new institution to consult with the cognizant progam officer if such changes are anticipated.

EQUIPMENT

Title to equipment purchased or fabricated by an academic institution or other nonprofit organization with NSF grant funds normally vests in the grantee institution. Special situations may require that title be vested in the Government or that NSF reserve the right to require the grantee to transfer title to the Government or a third party on expiration of the grant. Title to equipment acquired through an NSF grant by a small business or other commercial firm normally will vest in the Government. When title to specialized research equipment purchased with grant funds vests in the grantee institution and the principal investigator transfers to another nonprofit institution, NSF may encourage transfer of the equipment to the new institution provided it is not required at the institution holding title, the cost of transfer is not excessive, and the principal investigator continues the research effort at the new location.

SUBCONTRACTS

If a subcontract becomes necessary after a grant has been made, the grantee must submit for NSF approval the proposed performance statement and budget, a statement indicating the basis for selection of the contractor, and a justification of the proposed arrangement. The request must be signed by the principal investigator and endorsed by the aurthorized institutional official.

EXCESS GOVERNMENT PROPERTY

As a means of providing additional support and conserving supply and equipment funds, the Foundation may sponsor the transfer of a limited quantity of excess Government property to an NSF grantee. To receive information concerning the availability of property, an eligible grantee should request in writing that the Project Property Section of the Foundation make arrangements to place the grantee on the General Services Administration's mailing list for information on the availability of property. Before transfer of excess Government property can be authorized, justification must be provided to the Foundation by the grantee that the property will further the objectives of an active NSF grant. (See Important Notice 58 , Exhibit VIII-3, *NSF Grant Policy Manual*).

TERMINATION OF GRANTS

Foundation grants may be terminated for cause in accordance with the procedures contained in the Grant General Conditions. Grants also may be terminated by mutual agreement. Termination by mutual agreement shall not affect the financial commitment of grant funds that, in the judgment of the Foundation and the grantee, had become firm before the effective date of the termination.

GRANT REPORTS

Progress Reports—Principal investigators are required to submit a technical progress report (five copies) to the cognizant ASRA program officer every six months unless otherwise specified in the award instrument. The report should briefly summarize activity during the previous period, identify any significant developments and describe any problems encountered.

Final Reports—Within 90 days after the expiration of a grant, the grantee is required to submit final expenditure information and a Final Project Report (NSF form 98A). Final expenditure information is supplied by grantees in the quarterly Federal Cash Transactions Report (SF 272). The NSF version of this report is a computer listing, furnished by the Foundation, listing all NSF grants at the institution. Instructions for completing this report are contained in the *NSF Grant Policy Manual*. NSF extracts all the fiscal information needed to close out awards from the Federal Cash Transactions Report and does not require grantees to submit a separate Financial Status Report (SF 269) for each completed award.

The Final Project Report (NSF Form 98A) contains the technical information needed by the Foundation for purposes of program management and to inform the public about the results of research it supports. A statement on the utilization of the research (e.g., degree of utilization already achieved and anticipated future utilization) should be included in the report. A copy of the form and the associated instructions are attached in Appendix VI.

In addition, most ASRA programs require a minimum of 15 copies of the final technical report to be submitted prior to the expiration date of the award or upon completion of the project, which ever occurs first. The exact format and number of copies required will be specified in the award instrument.

Where applicable, a minimum of three copies of journal articles, manuals, books and other documents developed under the grant should be submitted to the ASRA program officer.

INVENTIONS, SOFTWARE, AND COPYRIGHTS

Each Foundation grant in support of research is subject to a patent and invention clause. The clause governs, in a manner calculated to protect the public interest and the equities of the grantee, the disposition of inventions made or conceived under the grant. Generally, it provides that, whenever an invention is conceived or first actually reduced to practice by the grantee or its employees in the course of a research grant, the grantee must furnish the Foundation with complete information thereon. The Foundation will determine whether a patent application should be filed and the disposition of the invention and rights in any resulting application or patent.

Grants for support of data banks or the creation of computer software of wide usefulness are subject to conditions reserving to the Foundation and to the general public certain rights to access to these data.

In an effort to provide for the widest practicable and appropriate dissemination of research results, grantees and researchers may not assert a copyright claim in any reports, books, monographs, films, computer programs or other materials. These materials may not contain any printed restrictions concerning reproduction or use unless specifically provided for by the award or authorized in writing by NSF. This, however, is not intended to preclude the publishing of articles in copyrighted scientific or professional journals.

Requests for permission to claim copyright in published materials should explain how copyright, rather than placing the material in public domain, will enhance dissemination and should set forth a proposed publication plan. If copyright is authorized by NSF and commerical publication is to be undertaken, NSF will require review of the publisher selection procedures, the publication agreement, and control over the disposition of income or royalties.

All written materials, whether published or not, shall be subject to a royalty-free, irrevocable, worldwide, nonexclusive license by the United States Government to reproduce, perform, translate, and otherwise use and to authorize others to use such materials for government purposes. In addition, the Government reserves the right to reproduce and sell the materials through the National Technical Service (NTIS), the Government Printing Office (GPO) or other sources. In some instances, in order to obtain distribution, NSF may be willing to accept a more limited arrangement.

If extracts of copyrighted materials, such as journal reprints or published illustrations, are to be included in a report or other materials, prior permission should be obtained from the copyright holder(s) and notice of such permission included in the report or materials.

ACKNOWLEDGMENT OF SUPPORT AND DISCLAIMER

Any publication based on research activity supported by the Foundation must contain the following acknowledgment: "This material is based upon work supported by the National Science Foundation under Award No. ______________." All materials, except scientific articles or papers published in scientific journals, also must contain the following statement: "Any opinions, findings, and conclusions or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the views of the National Science Foundation."

PROPOSAL AS PUBLIC RECORD

A proposal that results in an NSF grant becomes part of the record of the transaction and will be available to the public on specific request. Information or material that the Foundation and the grantee mutually agree to be of a privileged nature will be held in confidence to the extent permitted by law, including the Freedom of Information Act (5 U.S.C. 552). Without assuming any liability for inadvertent disclosure, NSF will seek to limit dissemination of such information to its employees and, when necessary for evaluation of the proposal, to outside reviewers. Accordingly, any privileged information should be in a separate, accompanying statement bearing a legend similar to the following:

> "Following is (proprietary) (specify) information that (name of proposing organization) requests not to be released to persons outside the Government, except for purposes of evaluation."

OTHER ASRA CONSIDERATIONS

Product Evaluation

Products of research supported by ASRA, such as books and reports, may be evaluated by scientific peers and potential users of research. The results of such evaluations may influence NSF decisions regarding subsequent requests for funds for publication or utilization activities. Such evaluations may be publicly distributed through NTIS or other mechanisms as determined by ASRA.

Correspondence

Inquiries concerning proposals and requests for additional information should be addressed to the program manager named on the NSF Acknowledgment Card or to:

Programs and Resources Officer
Directorate for Applied Science
and Research Applications (ASRA)
National Science Foundation
Washington, D.C. 20550

Please show the telephone number of the applicant on all correspondence.

APPENDIX I

BEST DOCUMENT AVAILABLE

PROPOSAL TO THE NATIONAL SCIENCE FOUNDATION
Cover Page

FOR CONSIDERATION BY NSF ORGANIZATIONAL UNIT (Indicate the most specific unit known, i.e. program, division, etc.)	IS THIS PROPOSAL BEING SUBMITTED TO ANOTHER FEDERAL AGENCY? Yes ____ No ____ ; IF YES, LIST ACRONYM(S):
PROGRAM ANNOUNCEMENT/SOLICITATION NO.:	CLOSING DATE (IF ANY):

NAME OF SUBMITTING ORGANIZATION TO WHICH AWARD SHOULD BE MADE (INCLUDE BRANCH/CAMPUS/OTHER COMPONENTS)

ADDRESS OF ORGANIZATION (INCLUDE ZIP CODE)

TITLE OF PROPOSED PROJECT

REQUESTED AMOUNT	PROPOSED DURATION	DESIRED STARTING DATE
PI/PD DEPARTMENT	PI/PD ORGANIZATION	PI/PD PHONE NO.

	SOCIAL SECURITY NO.*	DATE OF HIGHEST DEGREE ACHIEVED*	MALE*	FEMALE*
PI/PD NAME				
ADDITIONAL PI/PD				
ADDITIONAL PI/PD				
ADDITIONAL PI/PD				
ADDITIONAL PI/PD				

FOR RENEWAL OR CONTINUING AWARD REQUEST, LIST PREVIOUS AWARD NO.:	IF SUBMITTING ORGANIZATION IS A SMALL BUSINESS CONCERN, CHECK HERE ☐ (See CFR Title 13, Part 121 for Definitions)

*Submission of SSN and other personal data is voluntary and will not affect the organization's eligibility for an award. However, they are an integral part of the NSF information system and assist in processing proposals. SSN solicited under NSF Act of 1950, as amended.

CHECK APPROPRIATE BOX(ES) IF THIS PROPOSAL INCLUDES ANY OF THE ITEMS LISTED BELOW:

☐ Animal Welfare
☐ Endangered Species
☐ Historical Sites
☐ Human Subjects
☐ Marine Mammal Protection
☐ Pollution Control
☐ National Environmental Policy Act
☐ Research Involving Recombinant DNA Molecules
☐ Proprietary and Privileged Information

PRINCIPAL INVESTIGATOR/ PROJECT DIRECTOR	**AUTHORIZED ORGANIZATIONAL REP.**	**OTHER ENDORSEMENT (optional)**
NAME	**NAME**	**NAME**
SIGNATURE	**SIGNATURE**	**SIGNATURE**
TITLE	**TITLE**	**TITLE**
DATE	**DATE**	**DATE**

BEST DOCUMENT AVAILABLE

APPENDIX II

STANDARD FORM 424 (SPECIMEN)

OMB Approval No. 29–R0218

FEDERAL ASSISTANCE

1. TYPE OF ACTION (*Mark appropriate box*)
   - ☐ PREAPPLICATION
   - ☐ APPLICATION
   - ☐ NOTIFICATION OF INTENT (Opt.)
   - ☐ REPORT OF FEDERAL ACTION

2. APPLICANT'S APPLICATION
   a. NUMBER
   b. DATE *Year month day* 19

Leave Blank

3. STATE APPLICATION IDENTIFIER
   a. NUMBER
   b. DATE ASSIGNED *Year month day* 19

SECTION I—APPLICANT/RECIPIENT DATA

4. LEGAL APPLICANT/RECIPIENT
   - a. Applicant Name :
   - b. Organization Unit :
   - c. Street/P.O. Box :
   - d. City :
   - e. County :
   - f. State :
   - g. ZIP Code:
   - h. Contact Person (*Name & telephone No.*) :

5. FEDERAL EMPLOYER IDENTIFICATION NO.

6. PROGRAM (*From Federal Catalog*)
   a. NUMBER ☐☐•☐☐☐
   b. TITLE

7. TITLE AND DESCRIPTION OF APPLICANT'S PROJECT

8. TYPE OF APPLICANT/RECIPIENT
   - A–State
   - B–Interstate
   - C–Substate District
   - D–County
   - E–City
   - F–School District
   - G–Special Purpose District
   - H–Community Action Agency
   - I– Higher Educational Institution
   - J– Indian Tribe
   - K–Other (*Specify*):

   Enter appropriate letter ☐

9. TYPE OF ASSISTANCE
   - A–Basic Grant
   - B–Supplemental Grant
   - C–Loan
   - D–Insurance
   - E–Other

   Enter appropriate letter(s) ☐☐

10. AREA OF PROJECT IMPACT (*Names of cities, counties, States, etc.*)

11. ESTIMATED NUMBER OF PERSONS BENEFITING

12. TYPE OF APPLICATION
    - A–New
    - B–Renewal
    - C–Revision
    - D–Continuation
    - E–Augmentation

    Enter appropriate letter ☐

13. PROPOSED FUNDING

a. FEDERAL	$ .00
b. APPLICANT	.00
c. STATE	.00
d. LOCAL	.00
e. OTHER	.00
f. TOTAL	$ .00

14. CONGRESSIONAL DISTRICTS OF:
    a. APPLICANT
    b. PROJECT

15. TYPE OF CHANGE (*For 12c or 12e*)
    - A–Increase Dollars
    - B–Decrease Dollars
    - C–Increase Duration
    - D–Decrease Duration
    - E–Cancellation
    - F–Other (*Specify*):

    Enter appropriate letter(s) ☐☐☐

16. PROJECT START DATE *Year month day* 19

17. PROJECT DURATION *Months*

18. ESTIMATED DATE TO BE SUBMITTED TO FEDERAL AGENCY ▶ *Year month day* 19

19. EXISTING FEDERAL IDENTIFICATION NUMBER

20. FEDERAL AGENCY TO RECEIVE REQUEST (*Name, City, State, ZIP code*)

21. REMARKS ADDED ☐ Yes ☐ No

SECTION II—CERTIFICATION

22. THE APPLICANT CERTIFIES THAT ▶

    a. To the best of my knowledge and belief, data in this preapplication/application are true and correct, the document has been duly authorized by the governing body of the applicant and the applicant will comply with the attached assurances if the assistance is approved.

    b. If required by OMB Circular A-95 this application was submitted, pursuant to instructions therein, to appropriate clearinghouses and all responses are attached:

	No response	*Response attached*
(1)	☐	☐
(2)	☐	☐
(3)	☐	☐

23. CERTIFYING REPRESENTATIVE
    a. TYPED NAME AND TITLE
    b. SIGNATURE
    c. DATE SIGNED *Year month day* 19

SECTION III—FEDERAL AGENCY ACTION

24. AGENCY NAME

25. APPLICATION RECEIVED *Year month day* 19

26. ORGANIZATIONAL UNIT

27. ADMINISTRATIVE OFFICE

28. FEDERAL APPLICATION IDENTIFICATION

29. ADDRESS

30. FEDERAL GRANT IDENTIFICATION

31. ACTION TAKEN
    - ☐ a. AWARDED
    - ☐ b. REJECTED
    - ☐ c. RETURNED FOR AMENDMENT
    - ☐ d. DEFERRED
    - ☐ e. WITHDRAWN

32. FUNDING

a. FEDERAL	$ .00
b. APPLICANT	.00
c. STATE	.00
d. LOCAL	.00
e. OTHER	.00
f. TOTAL	$ .00

33. ACTION DATE ▶ *Year month day* 19

34. STARTING DATE *Year month day* 19

35. CONTACT FOR ADDITIONAL INFORMATION (*Name and telephone number*)

36. ENDING DATE *Year month day* 19

37. REMARKS ADDED ☐ Yes ☐ No

38. FEDERAL AGENCY A-95 ACTION

    a. In taking above action, any comments received from clearinghouses were considered. If agency response is due under provisions of Part 1, OMB Circular A-95, it has been or is being made.

    b. FEDERAL AGENCY A-95 OFFICIAL (*Name and telephone no.*)

424–101

STANDARD FORM 424 PAGE 1 (10–75)
Prescribed by GSA, Federal Management Circular 74–7

BEST DOCUMENT AVAILABLE

APPENDIX III

NOTICE OF RESEARCH PROJECT
SCIENCE INFORMATION EXCHANGE

SMITHSONIAN INSTITUTION
NATIONAL SCIENCE FOUNDATION
PROJECT SUMMARY

PROJECT NO. (Do not use this space)	
NSF AWARD NO.	

1. NAME OF INSTITUTION (INCLUDE BRANCH/CAMPUS & SCHOOL OR DIVISION)

2. MAILING ADDRESS

3. PRINCIPAL INVESTIGATOR AND FIELD OF SCIENCE/SPECIALTY

4. TITLE OF PROJECT

5. SUMMARY OF PROPOSED WORK (LIMIT TO 22 PICA OR 18 ELITE TYPEWRITTEN LINES)

FOR NSF USE ONLY

DIVISION (OFFICE) AND DIRECTORATE	PROGRAM	
SECTION	PROPOSAL NO.	F.Y.

FOR DGC USE ONLY

START AND END DATES	AMOUNT GRANTED

NSF FORM 4 (7-78)

1. Proposal Folder
2. Program Suspense
3. Division of Grants & Contracts
4. Science Information Exchange
5. Principal Investigator
6. Off. of Govt. & Pub. Progs.
7. Assistant Director

APPENDIX IV

BEST DOCUMENT AVAILABLE

SUMMARY PROPOSAL BUDGET

FOR NSF USE ONLY

PROPOSAL NO.

DURATION (MONTHS)

PROPOSED	REVISED

ORGANIZATION AND ADDRESS

PRINCIPAL INVESTIGATOR/PROJECT DIRECTOR

NSF USE	**A. SENIOR PERSONNEL** (LIST BY NAME; SHOW NUMBERS OF PEOPLE IN BRACKETS; SALARY AMOUNTS MAY BE LISTED ON SEPARATE SCHEDULE) GPM 205.1b	NSF FUNDED MAN MONTHS			FUNDS REQUESTED BY PROPOSER	FUNDS GRANTED BY NSF (IF DIFFERENT)
		CAL.	ACAD.	SUMR.		
	1. P.I./P.D.				$	$
	2. CO P.I./P.D.				$	$
	3. CO P.I./P.D.				$	$
	4. CO P.I./P.D.				$	$
	5. CO P.I./P.D.				$	$
11115	6. ( ) ← SUBTOTALS A1 - A5 →				$	$
	FACULTY AND OTHER SENIOR ASSOCIATES (ATTACH EXTRA SHEET IF NECESSARY)	▨	▨	▨	▨	▨
	7.				$	$
	8.				$	$
	9.				$	$
	10.				$	$
	11.				$	$
11117	12. ( ) ← SUBTOTALS A7 - A11 →				$	$
	B. OTHER PERSONNEL (LIST NUMBERS IN BRACKETS)	▨	▨	▨	▨	▨
11141	1. ( ) POSTDOCTORAL ASSOCIATES				$	$
11149	2. ( ) OTHER PROFESSIONALS				$	$
11150	3. ( ) GRADUATE STUDENTS				$	$
11152	4. ( ) UNDERGRADUATE STUDENTS				$	$
11182	5. ( ) SECRETARIAL - CLERICAL				$	$
11183	6. ( ) TECHNICAL, SHOP, OTHER				$	$
	TOTAL SALARIES AND WAGES (A+B)				$	$
11200	**C. FRINGE BENEFITS** (IF CHARGED AS DIRECT COSTS)				$	$
	TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A+B+C)				$	$
	D. EQUIPMENT (LIST ITEMS AND DOLLAR AMOUNTS FOR EACH ITEM)				▨	▨
23181	TOTAL EQUIPMENT				$	$
	E. MATERIALS AND SUPPLIES				▨	▨
32630					$	$
	F. DOMESTIC TRAVEL					
42111					$	$
	G. FOREIGN TRAVEL (LIST DESTINATION AND AMOUNT FOR EACH TRIP; GPM 731)				▨	▨
42112					$	$

PAGE 1 OF 2 PAGES

BEST DOCUMENT AVAILABLE

SUMMARY PROPOSAL BUDGET

PROPOSAL NO.

52500	H. PUBLICATION COSTS/PAGE CHARGES	$	$
62315	I. COMPUTER (ADPE) SERVICES	$	$
	J. CONSULTANT SERVICES (IDENTIFY CONSULTANTS BY NAME AND AMOUNT; GPM 516)		
		$	$
	K. PARTICIPANT SUPPORT COSTS, IF ALLOWED BY PROGRAM GUIDE (ITEMIZE) GPM 518		
	1. STIPENDS $ ______		
	2. TRAVEL $ ______		
	3. SUBSISTENCE $ ______		
	4. OTHER - SPECIFY $ ______		
	5. TOTAL PARTICIPANT COSTS (K1 + K2 + K3 + K4)	$	$
	L. ALL OTHER DIRECT COSTS (List items and dollar amounts. Details of subcontracts, including work statements and budget, should be explained in full in proposal.)		
	$ ______		
	$ ______		
	$ ______		
	$ ______		
65001	TOTAL OTHER DIRECT COSTS	$	$
	M. TOTAL DIRECT COSTS (A THROUGH L)	$	$
	N. INDIRECT COSTS (Specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs included in on/off campus bases in remarks.)		
74100	TOTAL INDIRECT COSTS	$	$
	O. TOTAL DIRECT AND INDIRECT COSTS (M + N)	$	$
74500	P. LESS RESIDUAL FUNDS (If for further support of current project; GPM 252 and 253)	$	$
75000	Q. AMOUNT OF THIS REQUEST (O MINUS P)	$	$

REMARKS

NOTE: SIGNATURES REQUIRED ONLY FOR REVISED BUDGET (GPM 233). THIS IS REVISION NO.

SIGNATURE OF PRINCIPAL INVESTIGATOR/PROJECT DIRECTOR	DATE OF SIGNATURE	TYPED OR PRINTED NAME AND TITLE
SIGNATURE OF AUTHORIZED ORGANIZATIONAL REPRESENTATIVE	DATE OF SIGNATURE	TYPED OR PRINTED NAME AND TITLE

FOR NSF USE ONLY

INDIRECT COST RATE VERIFICATION			PROGRAM OFFICER APPROVAL
Date Checked	Date of Rate Sheet	Signature	

Grant Number	Amend No.	Institution	Organization	Fund Acct.	Program	Object	

	Proposal Number	Dur.	Chg.	Award Date	Proposed Amount	Propd. Dur.	

APPENDIX V

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Current and Pending Support

The following information should be provided for each investigator and other senior personnel (see p. 00). Failure to provide this information may delay consideration of the proposal.

	A	B	C	D	E		F
	Supporting Agency	Project Title	Award Amount (or Annual Rate)	Period Covered By Award	Person-Months Or % of Effort Committed To The Project		Location Where Research Is/Will Be Performed
					ACAD.	SUMM.	
I. (Name of Principal Investigator)							
A. *Current Support*							
List—If none, Report none	——	——	——	——	——	——	——
B. *Proposals Pending*							
1. List this proposal	——	——	——	——	——	——	——
2. Other pending proposals, including renewal applications	——	——	——	——	——	——	——
3. Proposals planned to be submitted in near future	——	——	——	——	——	——	——
II. (Name of co-principal investigator and/or faculty associate	——	——	——	——	——	——	——
A.							
B.							
III. Transfer of Support If this project has previously been funded by another agency, please list and furnish information for immediately preceding funding period.	——	——	——	——	——	——	——
IV. (Other agencies to which this proposal has been/will be submitted)	——						

BEST DOCUMENT AVAILABLE

APPENDIX VI

NATIONAL SCIENCE FOUNDATION
Washington, D.C. 20550

FINAL PROJECT REPORT
NSF FORM 98A

PLEASE READ INSTRUCTIONS ON REVERSE BEFORE COMPLETING

PART I–PROJECT IDENTIFICATION INFORMATION

1. Institution and Address

2. NSF Program

3. NSF Award Number

4. Award Period
From To

5. Cumulative Award Amount

6. Project Title

PART II–SUMMARY OF COMPLETED PROJECT *(FOR PUBLIC USE)*

PART III–TECHNICAL INFORMATION *(FOR PROGRAM MANAGEMENT USES)*

1. ITEM *(Check appropriate blocks)*	NONE	ATTACHED	PREVIOUSLY FURNISHED	TO BE FURNISHED SEPARATELY TO PROGRAM	
				Check (√)	Approx. Date
a. Abstracts of Theses					
b. Publication Citations					
c. Data on Scientific Collaborators					
d. Information on Inventions					
e. Technical Description of Project and Results	▨				
f. Other *(specify)*	▨				

2. Principal Investigator/Project Director Name *(Typed)*

3. Principal Investigator/Project Director Signature

4. Date

NSF Form 98A (5-78) Supersedes All Previous Editions

Form Approved OMB No. 99R0013

INSTRUCTIONS FOR FINAL PROJECT REPORT
(NSF FORM 98A)

This report is due within 90 days after the expiration of the award. It should be submitted in two copies to:

National Science Foundation
Division of Grants and Contracts
Post-Award Projects Branch
1800 G Street, N.W.
Washington, D.C. 20550

INSTRUCTIONS FOR PART I

These identifying data items should be the same as on the award documents.

INSTRUCTIONS FOR PART II

The summary (about 200 words) must be self-contained and intelligible to a scientifically literate reader. Without restating the project title, it should begin with a topic sentence stating the project's major thesis. The summary should include, if pertinent to the project being described, the following items:

- The primary objectives and scope of the project.
- The techniques or approaches used only to the degree necessary for comprehension.
- The findings and implications stated as concisely and informatively as possible.

This summary will be published in an annual NSF report. Authors should also be aware that the summary may be used to answer inquiries by nonscientists as to the nature and significance of the research. Scientific jargon and abbreviations should be avoided.

INSTRUCTIONS FOR PART III

Items in Part III may, but need not, be submitted with this Final Project Report. Place a check mark in the appropriate block next to each item to indicate the status of your submission.

a. Self-explanatory.
b. For publications (published and planned) include title, journal or other reference, date, and authors. Provide two copies of any reprints as they become available.
c. Scientific Collaborators: provide a list of co-investigators, research assistants and others associated with the project. Include title or status, e.g. associate professor, graduate student, etc.
d. Briefly describe any inventions which resulted from the project and the status of pending patent applications, if any.
e. Provide a technical summary of the activities and results. The information supplied in proposals for further support, updated as necessary, may be used to fulfill this requirement.
f. Include any additional material, either specifically required in the award instrument (e.g. special technical reports or products such as films, books, studies) or which you consider would be useful to the Foundation.

ASRA PROGRAMS IN BRIEF

The following is a summary in brief of the major program elements, objectives, and specific examples of research planned for support in the Applied Science and Research Applications (ASRA) program of the National Science Foundation.

INTEGRATED BASIC RESEARCH

The Division of Integrated Basic Research (IBR) is the division within the Applied Science and Research Applications Directorate which provides support for basic research that has a high relevance to major problems. This support will provide for increased funding for selected topic areas in the basic research directorates. Projects that will be considered for funding by IBR are initiated through the Foundation's basic research directorates. (Proposals should be submitted to the basic research programs in accordance with *Grants for Scientific Research*, NSF 78-41).

The Division is responsible for: (1) defining topic areas and related basic research disciplines; (2) stimulating research on the selected topic areas; and (3) assuring that funds are used as an add-on and do not displace support previously provided by the basic research directorates. The Division provides a direct link between ASRA and the basic research directorates.

APPLIED RESEARCH

The Division of Applied Research (AR) will provide an improved scientific understanding of a range of technical, social, economic and policy problems and increase the rate of technological innovation growing out of significant discoveries in various fields of science and engineering. By working closely with the disciplinary basic research programs throughout the Foundation, with public and private user groups, and with the scientific and engineering communities to which the Foundation relates, the Applied Research Subactivity is in a position to encourage and accelerate the application of basic scientific knowledge to a wide range of potential users.

Applied Social and Behavioral Sciences

The objectives of the Applied Social and Behavioral Sciences program are to provide an improved understanding of a broad range of significant economic, social, and technical problem areas and to suggest alternative solutions to these problems.

Public Policy and Regulation:

The objective of this program is to provide more and better information on policy issues of national concern such as unemployment, international trade, regulation, telecommunications, inflation and the use of scientific and technical information in judicial and administrative decisionmaking.

Public Service Delivery and Urban Problems:

Research will be supported that provides Federal, State and local government policymakers and managers, public interest groups, and other public and private voluntary associations with improved information on: (1) the changing character of urban areas in the United States; (2) the changing demands for services; (3) alternative mechanisms for improving governmental responsiveness to service needs; (4) improvements in the effectiveness and equity of service delivery by both the public sector and private market.

Industrial Organizations and Markets:

The focus of this program will be to provide an improved understanding of public and private processes, organizational structures, and policies as they relate: (1) to industrial organization and performance; and (2) to the effective use of human, capital, and natural resources within the American economic system. These studies will apply research findings and methodologies developed in anthropology, industrial sociology and psychology, political science, and economics to such things as analyses of markets for natural resources, and examinations of the impacts of innovation in the manufacturing, distribution, construction and extractive industries on the structure of work and work incentives.

Individual and Group Processes:

Research in this area seeks to identify and stimulate the development of new technologies and technical processes growing out of discoveries in the behavioral sciences. Such activities often involve multi-disciplinary research groups from various fields of engineering and computer science, along with behavioral scientists working on applications ranging from such things as new technologies for the blind or other sensory deprived individuals to new communication and control devices for industrial applications.

Applied Physical, Mathematical, and Biological Sciences and Engineering

The objectives of the Applied Physical, Mathematical, and Biological Sciences and Engineering program are to increase the rate of technological innovation growing out of discoveries in various fields of science and to accelerate the application and use of these technologies to improve the breadth and quality of long-range solutions to significant social, economic, and technical problems and policy issues which confront the United States.

Physical, Mathematical, and Engineering Applications:

Research will be supported that seeks to facilitate the rate of technological innovations which hold promise for long-run improvements in industrial processes, materials availability and handling, and increased efficiency. A coherent research area initiated in RANN which builds on developments of computer-based technologies to improve the efficiency of production and manufacturing will continue. In addition, this area will be receptive to applied research proposals from the scientific community which build on fundamental research in such areas as catalysis, laser chemistry, and mathematics.

Biological and Ecological Applications:

Research in this area seeks to accelerate the rate of technological innovation based on basic advances in the biological and ecological disciplines, including exploring the potential of genetic manipulations for the economical production of new materials, the use of protoplast fusion to speed tests of new plant materials, and the modeling and management of ecosystems as a way of increasing our effective use of land, energy, and water and our renewable resources capabilities. It also seeks to provide information on the links between ecosystems and economic and social systems as a way of improving the information base for formulating public policies which affect our national resource capability.

Geophysical and Environmental Applications:

Research will be supported to accelerate the rate of technological innovations based on advances in the oceanographic and earth sciences. These include methods for exploring ocean resources, techniques for utilizing coastal and estuary areas for resource production, and the improvement of techniques and sensing devices for exploration and extraction of minerals from land areas.

PROBLEM-FOCUSED RESEARCH APPLICATIONS

The goal of the Problem-Focused Research Applications (PFRA) program is to apply United States scientific and technological capabilities to selected societal problems of critical national importance to assist in their clarification or resolution.

The common objectives of the programs within the Problem-Focused Research Applications Subactivity are to concentrate research and proof-of-concept experiments on selected problem areas in order to:

- Facilitate the incorporation of science as a working tool for problem resolution in the public and private sectors;
- Provide support for problem-focused research that bridges from basic research discoveries to application; and,
- Enhance the capability and capacity of nontraditional research users to employ research results and methods.

Earthquake Hazards Mitigation:

The objectives of the Earthquake Hazards Mitigation program are to develop methods and techniques that can provide effective protection from man, his works, and institutions from life loss, personal injury, property damage, social dislocation, and economic and ecological disruption associated with potential or realized earthquake hazards. The program is organized in three component areas: Siting, Design, and Policy.

Siting

The specific objectives of this research program are to:

- Develop a comprehensive data base on the nature of earthquake motion at typical construction sites and for representative structures;
- Establish the physical basis for characterizing the nature of earthquake motions and the dynamic forces generated by such motions and by other natural hazards;
- Develop capabilities for prediction of the magnitude and frequencies of ground motion;
- Develop a methodology for qualitative and quantitative estimates of local or regional risk associated with earthquakes and other types of hazards and combined hazards;
- Develop a comprehensive and unified program to improve geotechnical engineering practices applicable to soil dynamics, foundation design, failure and instability, and other aspects of earthquake ground motion; and,
- Identify procedurs for integrating information on natural hazards into land use planning; urban and coastal zone planning, offshore engineering and siting procedures.

Design

The specific research objective of this program is to:

- Improve the characterization of earthquake and natural hazard loadings necessary for the economical design of structures subject to dynamic loading;
- Develop new methods of analysis and design of buildings and structures of all types which will take into account nonlinear and inelastic behavior of materials and structures;
- Develop methods to assess the hazard potential and risk assessments applicable to existing structures and facilities, and devise innovative methods for improving performance within economically acceptable bounds;
- Obtain information for engineering analysis and design by observing the damage of facilities following actual earthquakes, and incorporate this information into standard design practice;
- Develop improved computational capability for dynamic analysis of structures and facilities and improve user access to any computer software which is developed;
- Develop model standards and design criteria for design of structures and facilities subjected to earthquake and natural hazard loadings; and,
- Conduct detailed studies of the behavior of smaller nonengineered structures and secondary components of buildings to improve recommended minimum analysis and design guidelines.

Policy

The specific objectives of this research program are to:

- Expand the base of knowledge on alternative social adjustments to earthquakes;
- Identify the social, economic, political, legal and related factors which facilitate or hinder the adoption of both social and technological solutions to earthquake hazards;
- Facilitate the beneificial use of earthquake hazard mitigation measures by devising effective techniques for disseminating information to the public and to decisionmakers at the local, State and National levels; and,
- Investigate measures which will reduce possible negative social, economic and political consequences of earthquake predictions and warnings.

Chemical Threats to Man and the Environment:

The Chemical Threats to Man and the Environment program supports research to increase our scientific knowledge of man-made contaminants and naturally occurring toxicants and to make this knowledge available to appropriate users. The objectives of the program are to:

- Define the exposure of ecosystems and human populations to chemicals and their conversion products by determining chemical pathways and transformations in the environment;
- Accelerate the application of recent discoveries in the basic sciences to the identification and measurement of environmental contaminants;
- Develop methods to enable us to predict the toxicological effects of chemicals on humans based on animal tests and other laboratory data; and,
- Identify contaminant effects on living forms critical for the functioning of whole ecosystems.

Alternative Biological Sources of Materials

The program element is directed toward alleviating national dependence on selected scarce resources by making alternative biological sources of materials available in the United States. The objectives of the program are to:

- Determine which biological sources constitute promising alternatives;
- Develop biologically based processes needed to convert the sources to useful materials; and,
- Determine the socioeconomic, technical, and environmental impacts of various proposed biological alternative systems on the country.

Science and Technology to Aid the Physically Handicapped

The Foundation is currently planning a program to focus science and technology on the problems of the physically handicapped. The objectives will be:

- to improve sensory capabilities, locomotion, and manipulative ability to compensate for losses due to handicaps;
- to investigate the social, economic and institutional barriers which inhibit full participation of the handicapped in society; and
- to study mechanisms to improve the availability of technological aids to the handicapped.

A formal program announcement will be released at a later date. NSF anticipates participation of universities, industry, small business and nonprofit institutions in the program.

INTERGOVERNMENTAL SCIENCE AND RESEARCH AND DEVELOPMENT INCENTIVES

The objectives of this program are to:

- Facilitate the integration of scientific and technical resources into the policy formulation, management support, and program operation activities of State and local governments; and,
- Test and evaluate selected incentives which the Federal Government may use to increase R&D investment in the private sector of the economy and to stimulate the acclerated introduction of innovative technology into commercial use where new products, processes, or services are needed in the national interest.

Intergovernmental Program

The primary objective of the Intergovernmental program is to facilitate the integration of scientific and technical resources into the policy formulation, management support, and program operation activities in State and local governments. The Intergovernmental program seeks to strengthen the public management capacity and capability of individual local communities and States in order: (1) to further the understanding of issues with significant scientific and technical components, and (2) to capitalize on the contributions of scientific and technical resources in the resolution of such issues.

Local Government:

The objectives of the Local Government subprogram are threefold:

- Facilitate the establishment of scientific and technological systems in individual local jurisdictions to further the understanding of science and technology as a major resource for local government problem solving and, at the same time, serve as catalysts for regional innovation groups;
- Promote the establishment of regional innovation groups to provide synergistic approaches to solving common problems

with scientific and technical components; and
- Establish national innovation networks to facilitate the development of periodic local government research and development agendas, to enhance market aggregation, and to provide communication networks and linkage mechanisms for the regional innovation groups.

State Government:

The objectives of the State Government program are to:

- Strengthen the public management capacity and capability of individual States through new and improved structures, processes, and procedures for integrating scientific and technical resources into their policy development and management support activities;
- Foster interjurisdictional cooperation on a regional and national basis in order to assist individual States in their capacity building efforts and to address cooperatively common issues of critical concern; and,
- Develop improved intergovernmental cooperation in the planning and implementation of national research and development agendas in order to ensure their relevance to State needs and to enhance the probability that research and development activities will have an aggregated market and be utilized.

Science and Technology Resources:

The Science and Technology Resources subprogram focuses on increasing the potential of various scientific and technical organizations to serve the needs of State and local governments and to mobilize such resources for meeting more effectively these needs. It differs from the local and State Government subelement in that the emphasis is on fostering the exchange of experience and lessons learned by these resource organizations in their attempts to supply scientific and technical expertise in meeting public sector needs.

Industrial Program

The Industrial Program considers unsolicited proposals to test and evaluate selected incentives to increase technological innovation and R&D investment in the private sector where new technology is needed in the national interest. It also supports research involving joint proposals of small business and other organizations and institutions, such as universities, associations, or large businesses, and research relating to improving the science and technology capabilities of fragmented industries, such as those with large numbers of small firms or industries that traditionally spend little on R&D.

PROBLEM ANALYSIS

The goal of the Office of Problem Analysis (OPA) is to identify and analyze major national problems with significant scientific content to provide a preliminary assessment of the appropriate role of science and technology, the Federal Government and the NSF in their resolution. The Office will support analyses of a wide range of potential research topics and problem areas for use in selecting future research directions for the Directorate for Applied Science and Research Applications.

To fulfill this goal, OPA will draw upon a wide range of expertise from the research community, professional and scientific associations, private industry, State and local governments and other user communities to help define the problem and determine research priorities.

It is anticipated that most of the resources of OPA will be dispensed in a procurement mode. However, the Office will consider unsolicited proposals for projects to analyze problem areas to determine applied research needs. These proposals should address themselves to providing answers to the following questions:

- What is the nature of the problem and what issues are researchable?
- Will new or additional research have a potential high payoff either through a better understanding of the problem or the development of a technical base which will contribute to its solution?
- What research is currently underway on the subject and what are its sources of support?
- What is the size and capability of the research community to address the problem?
- What is the most appropriate organization for supporting any additional research? Is there a unique role for NSF and ASRA?

ntent-to-Submit Card:

APPLICANT MANAGEMENT AND ORGANIZATION CARD

TO BE FILLED OUT BY THE NATIONAL SCIENCE FOUNDATION

Date Received ______________________ **Proposal Number** ____________

TO BE FILLED OUT BY THE PROPOSER:

Name of Institution ______________________________

Name of Project Director ______________________________

Sponsored Programs(or equivalent) ______________________________

Telephone Number ______________________________

Proposal Acknowledgment Cards

(To be filled out by proposing institution)

Address this card to Institution's Business Office

DATE:
SUBMITTED BY:
PROPOSAL I.D. NO.:
PROPOSAL TITLE:

The National Science Foundation acknowledges receipt of a proposal from the above applicant which has been assigned the proposal number indicated. Please use this number in all future correspondence.

A separate acknowledgment is being sent to the individual named above.

Central Processing Section
Division of Information Systems

F.L. 23 (5-78)

Address this card to proposed Project Director/Principal Investigator

DATE:
PROPOSAL I.D. NO.:
PROPOSAL TITLE:

Your proposal has been received by NSF and has been assigned to this program for evaluation. Please refer to the above number in all future correspondence.

Consideration of proposals requires about six to nine months. If more time is needed, you will be notified. After a decision has been made by NSF on a proposal, anonymous verbatim copies of reviewers' comments are available to the principal investigator upon request.

A separate acknowledgment is being sent to your institution's business office. If you have any questions about the status of your proposal, please contact us.